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ABSTRACT

A hybrid combined cycle power generation system for producing alternating current electric power. The system includes at least one industrial gas turbine and at least one aeroderivative turbine. The system may also include an HRSG and a steam turbine. Use of both an industrial gas turbine and an aeroderivative turbine permits the system to take advantage of the benefits of each type of turbine while diminishing the drawbacks associated with each type of turbine. The aeroderivative turbine is capable of quick start up and can therefore provide power relatively quickly. Thus the aeroderivative gas turbine can be relied on at startup to quickly begin producing power, while the industrial gas turbine, while the industrial gas turbine and steam turbine are brought online. Once online, the industrial gas turbine can be utilized for greater power production and longer running time. The aeroderivative turbine(s) may be used during periods of peak power demand and then shutdown when the demand decreases. In this way, both the industrial gas turbine and the steam turbine may operate at a relatively constant level, thereby increasing the stability and longevity of the system. Optional supplementary firing in the HRSGs can be utilized to produce additional steam which is directed to the steam turbine(s) to smooth transitions in power production levels as AD and IG turbines start and stop, or to produce additional power during short term peak power demand.